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10/726,794	12/02/2003	Osamu Kobayashi	GENSP013	6108

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/726,794	KOBAYASHI, OSAMU	
	Examiner	Art Unit	
	KENAN CEHIC	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 June 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-13,17-33 and 37-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-13,17-33 and 37-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, see Remarks, filed 06/02/2008, with respect to the rejection(s) of claim(s) 1, 2, 4, 8-11, 13, 18, 19, 21-24, 28-31, 33, 38, 39, 41-43 under 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shay (US 2004/0114607).

Double Patenting

Claim Rejections - 35 USC § 103

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1,2,4,6, 8-13, 17,19-26, 28-33, 37, 39,40,44-47 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims of US

7,177,329 B2. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following:

Instant Application 10726794	US Patent # 7,177,329
Claim 1. A packet based display interface arranged to couple a multimedia source device to a multimedia sink device. comprising: a transmitter unit coupled to the source device arranged to receive a source packet data stream in accordance with a native stream rate; a receiver unit coupled to the sink device; and a linking unit coupling the transmitter unit and the receiver unit arranged to transfer a multimedia data packet stream formed of a number of multimedia data packets based upon the source packet data stream in accordance with a link rate that is independent of the native stream rate between the transmitter unit and the receiver unit comprising: a unidirectional main link arranged to carry the multimedia data packets from the transmitter unit to the receiver unit and a bi-directional auxiliary channel arranged to transfer information between the transmitter unit and the receiver unit and vice versa wherein the linking unit does not include a clock.	Claims 1,2 Claim 1. A transmission efficient packet based display interface arranged to couple a multimedia source device to a multimedia sink device, comprising: a bi-directional auxiliary channel arranged to transfer information between the multimedia source device and the multimedia sink device and vice versa, wherein the information transferred over the auxiliary channel includes a set of packet attributes; and a unidirectional main link arranged to transport multimedia data packets from the multimedia source device to the multimedia sink device each having a multimedia data packet header wherein neither the main link nor the auxiliary channel include separate clock signal lines, and wherein each of the headers is reduced in size over what would otherwise be necessary since the packet attributes are communicated via the auxiliary channel prior to the transmission of the multimedia data packets over the main link and not in the packet headers. Claim 2. A transmission efficient packet based display interface as recited in claim 1, further comprising: a transmitter unit coupled to the source device arranged to receive a source packet data stream in accordance with a native stream rate; a receiver unit coupled to the sink device; and wherein the main link has an associated link transmission rate that is independent of the native stream rate.
Claim 2. A packet based display interface	Claim 4. A transmission efficient packet

as recited in claim 1, wherein the multimedia data packet stream is one of a number of multimedia data packet streams each having an associated adjustable data stream link rate that is independent of the native stream rate.	based display interface as recited in claim 3, wherein the multimedia data packet stream is one of a number of multimedia data packet streams each having an associated adjustable data stream link rate that is independent of the native stream rate.
Claim 4. A display interface as recited in claim 1, wherein the bi-directional auxiliary channel is formed of a uni-directional back channel configured to carry information from the sink device to the source device and a uni-directional forward channel included as part of the main channel for carrying information from the source device to the sink device in concert with the back channel.	Claim 5. A transmission efficient packet based display interface as recited in claim 4, wherein the bi-directional auxiliary channel is formed of a uni-directional back channel configured to carry information from the sink device to the source device and a uni-directional forward channel for carrying information from the source device to the sink device in concert with the back channel.
Claim 5. A display interface as recited in claim 2, wherein the main link unit further comprises: a number of virtual links each being associated with a particular one of the multi media data packet streams wherein each of said virtual links has an associated virtual link bandwidth and a virtual link rate	Claim 6. A transmission efficient packet based display interface as recited in claim 5, wherein the main link further comprises: a number of virtual links each being associated with a particular one of the multi media data packet streams wherein each of said virtual links has an associated virtual link bandwidth and a virtual link rate
Claim 6 .A display interface as recited in claim *5,* wherein a main link bandwidth is at least equal to an aggregate of the virtual link bandwidths.	Claim 7. A transmission efficient packer based display interface as recited in claim 6, wherein a main link bandwidth is at least equal to an aggregate of the virtual link bandwidths.
Claim 8. A display interface as recited in claim **1,** further comprising: a hot plug event detector unit arranged to automatically determine when an active sink device is connected to the linking unit.	Claim 8. A transmission efficient packet based display interface as recited in claim 1, further comprising: a hot plug event detector unit arranged to automatically determine when an active sink device is connected to the display interface.
Claim 9. A display interface as recited in claim 2, wherein the information includes display timing information used by the sink device to provide a displayed image based	Claim 9. A transmission efficient packet based display interface as recited in claim 1, wherein the information includes display timing information used by the sink device

upon the received data stream.	to provide a displayed image based upon the received data stream.
Claim 10. A display interface as recited in claim 1, wherein the information includes sync loss information, dropped packets information and results of training sessions information.	Claim 10. A transmission efficient packet based display interface as recited in claim 1, wherein the information includes sync loss information, dropped packets information and the results of training sessions information
Claim 11. A display interface as recited in claim 2, wherein the multimedia data packet transfer is an isochronous type transfer that includes a video/graphics data stream and a multichannel audio stream and wherein the information transfer is an asynchronous transfer.	Claim 11. A transmission efficient packet based display interface as recited in claim 1, wherein the multimedia data packet transfer is an isochronous type transfer that includes a video/graphics data stream and a multichannel audio steam and wherein the information transfer is an asynchronous transfer.
Claim 12. A display interface as recited in claim 1, wherein the link rate is adjustable in a range of approximately 1.0 Gigabits per second (Gbps) to approximately 2.5 Gbps.	Claim 12. A transmission efficient packet based display interface as recited in claim 1, wherein the main link rate is adjustable in a range that includes 1.0 Gigabits per second (Gbps) to 2.5 Gbps.
Claim 13. A display interface as recited in claim 1, wherein the receiver unit includes a time-base recovery unit arranged to regenerate a particular data stream's native rate based upon a time stamp embedded within the main link data packets.	Claim 13. A transmission efficient packet based display interface as recited in claim 2, wherein the receiver unit includes a time-base recovery unit arranged to regenerate a particular data stream's native rate based upon a time stamp embedded within the data packets and wherein the time stamp is based upon a determination of a number of native stream clocks in 2.sup.20 cycles of link cycle clock frequency period.
Claim 17. A display interface as recited in **claim 1,** wherein a native audio stream sate is calculated based upon the audio sample rate, the number of bits per sample and the corresponding link rate.	Claim 16. A transmission efficient packet based display interface as recited in claim 15, wherein a native audio stream rate is calculated based upon the audio sample rate, the number of bits per sample and the corresponding link rate.
Claim 19. A display interface as recited in claim 1, wherein some of the multimedia data packets include a number of sub-packets.	Claim 17. A transmission efficient packet based display interface as recited in claim 1, wherein some of the multimedia data packets include a number of sub-packets

	each having an associated sub-packet header.
Claim 20. A display interface as recited in claim 19 further comprising: a selective refresh unit included in the sink device that updates only a portion of a displayed graphics image for every video frame based upon a number of image coordinates corresponding to the updated portion of the displayed image by way of sub-packets included in a corresponding video data stream.	Claim 18. A transmission efficient packet based display interface as recited in claim 17 further comprising: a selective refresh unit included in the sink device that updates only a portion of a displayed graphics image for every video frame based upon a number of image coordinates corresponding to the updated portion of the displayed image by way of sub-packets included in a corresponding video data stream.
Claim 21. A packet based method of coupling a multimedia source device to a multimedia sink device, comprising: providing a source device having a transmitter unit coupled thereto; providing sink device having a receiver unit coupled thereto; receiving a source data stream in accordance with a native stream rate by the transmitter unit; coupling the transmitter unit and the receiver unit by way of a linking unit, wherein the linking unit does not include a clock line; forming a multimedia data packet stream formed of a number of multimedia data packets based upon the source data stream; and transferring the multimedia data packet stream in accordance with a link rate between the transmitter unit and the receiver unit.	See Claims 1,2 above.
Claim 22. A method as recited in claim 21, wherein the multimedia data packet stream is one of a number of multimedia data packet streams each having an associated adjustable data stream link rate that is independent of the native stream rate.	Claim 4. A transmission efficient packet based display interface as recited in claim 3, wherein the multimedia data packet stream is one of a number of multimedia data packet streams each having an associated adjustable data stream link rate that is independent of the native stream rate.
Claim 23. providing a unidirectional main link arranged to carry the multimedia data packets from	See claim 1 above.

the transmitter unit to the receiver unit; and providing a bi-directional auxiliary channel arranged to transfer information between the transmitter unit and the receiver unit and vice versa.	
Claim 24. A method as recited in claim 23, wherein the bi-directional auxiliary channel is formed of a uni-directional back channel configured to carry information from the sink device to the source device and a uni-directional forward channel included as part of the main channel for carrying information from the source device to the sink device in concert with the back channel.	Claim 5. A transmission efficient packet based display interface as recited in claim 4, wherein the bi-directional auxiliary channel is formed of a uni-directional back channel configured to carry information from the sink device to the source device and a uni-directional forward channel for carrying information from the source device to the sink device in concert with the back channel
Claim 25. a number of virtual links each being associated with a particular one of the multi media data packet streams wherein each of said virtual links has an associated virtual link bandwidth and a virtual link rate.	Claim 6. (see above)
Claim 26. wherein a main link bandwidth is at least equal to an aggregate of the virtual link bandwidths.	See Claim 7 above.
Claim 28. A method as recited in claim 22, wherein the information includes display timing information used by the sink device to provide a displayed image based upon the received data stream	See claim 8 above.
Claim 29. A method as recited in claim 22, wherein the information includes display timing information used by the sink device to provide a displayed image based upon the received data stream	See claim 9 above.
Claim 30. A method as recited in claim 21, wherein the information includes sync loss	See claim 10 above.

information, dropped packets information and the results of training sessions information.	
Claim 31. A method as recited in claim 22, wherein the multimedia data packet transfer is an isochronous type transfer that includes a video/graphics data stream and a multichannel audio stream and wherein the information transfer is an asynchronous transfer.	See claim 11 above.
Claim 32. A method as recited in claim 21, wherein the link rate is adjustable in a range of approximately 1.0 Gigabits per second (Gbps) to approximately 2.5 Gbps.	Claim 12 above.
Claim 33. A method as recited in claim 2 1, wherein the receiver unit includes a timebase recovery unit arranged to regenerate a particular data stream's native rate based upon a time stamp embedded within the main link data packets.	See claim 13 above.
Claim **37.** A method as recited in claim 21, wherein a native audio stream rate is calculated based upon the audio sample rate. the number of bits per sample and the corresponding link rate.	See claim 16 above.
Claim 39. A method as recited in claim 21, wherein some of the multimedia data packets include a number of sub-packets.	See claim 17 above.
Claim 40. A method as recited in claim 39 further comprising: a selective refresh unit included in the sink device that updates only a portion of a displayed graphics image for every video frame based upon a number of image coordinates corresponding to the updated portion of the displayed image by way of sub-packets included in a corresponding video data stream.	See claim 18 above.

Claim 44. Computer readable medium encoded with a computer program for packet based coupling of a source device and a display device. comprising: computer code for providing a source device having a transmitter unit coupled thereto; computer code for providing sink device having a receiver unit coupled thereto; receiving a source data stream in accordance with a native stream rate by the transmitter unit; computer code for coupling; the transmitter unit and the receiver unit by wav of a linking unit that does not include a clock line; computer code for forming a multimedia data packet stream formed of a number of multimedia data packet based upon the source data stream; and computer code for transferring the multimedia data packet stream in accordance with a link rate between the transmitter unit and the receiver unit, wherein when the multimedia data stream includes an audio stream having; no associated time stamp, then the source device informs the sink device by wav of the auxiliary channel of an audio sample rate and a number of bits per sample corresponding to the audio stream.	See claim 1,2,13-15
Claim 45. Computer readable medium as recited in claim 44, further comprising: computer code for providing a set of display attributes to the source device	See claim 1 above.

Claim 46. Computer readable medium as recited in claim 45, further comprising computer code for describing a format for the source data stream and the display device.	See claim 1 above.
Claim 47. wherein when the multimedia data stream includes an audio stream and there is no associated time stamp, then the source device informs the multimedia sink device by way of the auxiliary channel of an audio sample rate and a number of bits per sample corresponding to the audio stream.	See claim 1 above.

The Instant application has a similar scope of invention as in US patent 7,177,329 B2, but in different wording or format of claims. The common subject matter is a a transmitter unit coupled to the source device arranged to receive a source packet data stream in accordance with a native stream rate; a receiver unit coupled to the sink device; and a linking unit coupling the transmitter unit and the receiver unit arranged to transfer a multimedia data packet stream formed of a number of multimedia data packets based upon the source packet data stream in accordance with a link rate that is independent of the native stream rate between the transmitter unit and the receiver unit comprising: a unidirectional main link arranged to carry the multimedia data packets from the transmitter unit to the receiver unit and a bi-directional auxiliary channel arranged to transfer information between the transmitter unit and the receiver unit and vice versa wherein when the multimedia data stream includes an audio stream and there is no associated time stamp, then the source device informs the multimedia sink device by way of the auxiliary channel of an audio sample rate and a number of bits per sample corresponding to the audio stream.

It has been held that the omission of an element and its function is an obvious expedient if the remaining elements perform the same function as before. In re karlson, 136 USPQ 184 (CCPA). Also note Ex Parte Raine, 186 USPQ 375 (bd. App. 1969); omission of a reference element whose function is not needed would have been obvious to one skilled in the art.

3. Claim 7, 18, 27, 38 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1,2,13-15 of U.S. Patent No. US 7,177,329 in view of Wolf et al (US 6,914,637 B1).

For claim 7, 18, 27, 38, claims 1,2,13-1 5 of U.S. Patent No. US 7,177,329 teach the claimed invention as described in paragraph 2.

Furthermore for claim 7 and 27, claims 1,2,13- 15 of U.S. Patent No. US 7,177,329 teach , wherein the source data stream is packetized over the respective virtual link (see claim 6).

Patent No. US 7,177,329 does not disclose:

For claim 7 and 27, a mapping definition.

For claim 18 and 38, wherein the number of multimedia,data streams are multiplexed to form a single data stream suitable for transmission over the linking unit.

Wolf from the same or similar field of endeavor discloses a display systemlinterface with a mapping features:

For claim 7 and 27, Wolf discloses a mapping definition (see column 21 lines 59-61 "code word.. .mapped to source data").

For claim 18 and 38, Wolf discloses wherein the number of multimedia data streams

(see Figure 2 "Digvideo" and Figure 8 "Packet I", "Packet 2.. .") are multiplexed (see column 29 lines 37-42 "two or more streams.. ..time-multiplexer") to form a single data stream (Figure 8 "Packet l", "Packet 2.. .") suitable for transmission over the linlung unit (see Figure 2, CHO-CHC and column 29 lines 39-41 "multiplexed.. .one…Channel").

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Patent No. US 7,177,329 by using the features, as taught by Wolf, in order to a mapping features for a source (see column 21 lines 59-61).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 2, 4, 8-11, 13, 18, 19, 21-24, 28-31, 33, 38, 39, 41-43 rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (US 6,914,637 B1) in view of Shay et al. (US 2004/0114607)

For claim 1, Wolf et al. teaches a transmitter unit (see Figure 2, reference 1') coupled to the source device arranged to receive (see Figure 2, reference signs 13, 1', DigVideo, SPDIF, MCLK) a source

packet data stream (see Figure 2, reference 13, MPEG-2 are inherently packets of either audio or video) in accordance with a native stream rate (see column 11 lines 58-62, the audio can have different rates);

a receiver unit (see Figure 2, reference 2') coupled to the sink device (see Figure 2, reference 26 and 27); and

a linking unit (see Figure 2, reference CH0,CH1, CH2) coupling the transmitter unit and the receiver unit (see Figure 2, reference CH0,CH1, CH2) arranged to

transfer (see column 4 lines 57-66 and column 8 lines 44-51) see a multimedia data packet stream (see column 14 lines 30-33) formed of a number of multimedia data packets (see Figure 6 and 8 and column 14 lines 30-33) based upon the source packet data stream in accordance with a link rate that is

independent of the native stream rate between the transmitter unit and the receiver unit (see columns 12 line 63 through column 13 line 25 and column 17 lines 52-57) compromising : a unidirectional main link (see column 4 lines 57-66 and Figure 2 CH0-CHC, Wolf specifically defines that TMDS can be one-directional) arranged to carry multimedia data packets (see column 8 lines 9-14, video words are sent (word is generic

bundle of data just like a packet) column 14 lines 30-38, for auxiliary data, which can be audio (see column 5, lines 63-67)) from the transmitter unit to the receiver unit (see column 4 lines 57-66) and a bi-directional auxiliary channel (see Figure 2, reference DDC (also note bidirectional arrows), and column 59 lines 30-34 for bidirectional, also note in column 2 Wolf in his definition of a DVI link expressively list the TMDS and DDC channel separately) arranged to transfer information between the display device and a source device and vice versa (see column 59 lines 30-34 and see column 49 lines 18-23).

For claim 21, Wolf discloses a packet based method of coupling a multimedia source device (see Figure 2, reference signs 13, 1', DigVideo, SPDIF, MCLK) to a multimedia sink device (see Figure 2, reference 26 and 27), comprising:

providing a source device (see Figure 2, reference signs 13, 1', DigVideo, SPDIF, MCLK) having a transmitter unit coupled thereto (see Figure 2, reference 1');

providing sink device (see Figure 2, reference 26 and 27) having a receiver unit coupled thereto (see Figure 2, reference 2');

receiving a source data stream in accordance with a native stream rate by the transmitter unit; coupling the transmitter unit and the receiver unit by way of a linking unit (see Figure 2, reference CH0,CH1, CH2) ; forming a multimedia data packet stream (see column 14 lines 30-33) formed of a number of multimedia data packets (see Figure 6 and 8 and column 14 lines 30-33) based upon the source packet data stream (see col 12 lines 31-45 "input video"); and transferring the multimedia data packet stream (see column 14 lines 30-33) in accordance with a link rate (see columns 12 line 63 through column 13

line 25 and column 17 lines 52-57) between the transmitter unit (see Figure 2, reference 1') and the receiver unit (see Figure 2, reference 2').

For claim 2 and 22, Wolf et al. teaches a multimedia data packet stream is one of a number of multimedia data packet streams (see column 13 lines 25-29 and Figure 8 and column 10 lines 35-40) each having an associated adjustable data stream link rate that is independent of the native stream rate (see columns 12 line 63 through column 13 line 25, a clock between the transmitter and receiver is provided so that transmission can happen at the rate of the video/audio stream).

For claim 4 and 24, Wolf discloses a display interface as recited in claim 3, wherein the bi-directional

auxiliary channel is formed of a uni-directional back channel configured to carry information from the sink device to the source device (figure 2 and co150 lines 33-36) and a uni-directional forward channel included as part of the main channel for carrying information from the source device to the sink device in concert with the back channel (as seen from figure 2 and co12 lines 31 -36 and co12 lines 42-49).

For claim 8 and 28, Wolf discloses a a hot plug event detector unit arranged to automatically determine

when an active sink device is connected to the linking unit (column 2 lines 36-39).

For claim 9 and 29, Wolf discloses wherein the information includes display timing information used by the sink device to provide a displayed image based upon the received data stream (column 14 lines 9-10 describe a video preamble, which denotes the timing of the beginning of an active video period, which is used by the sink device to understand

that an active video period is beginning, so that the sink device understands that the next data is video data used to display images).

For claim 10 and 30, Wolf discloses all aspects of the invention of claim 1 and further discloses that the information includes sync loss (glitches, column 77 lines 47-50) information, dropped packets information (if packets are received then the receiver has evidence information that they have not been dropped), and the results of training session information (the reference of the rejection of claim 14 regarding the back channel includes configuration information relevant to the transmitter training the transmitter to be able to understand what type of display with which it will communicate, and the results of that session are the successful display of video or graphics or playback of audio).

For claim 11 and 31, Wolf discloses all aspects of the invention of claim 1 and further discloses that the multimedia data packet transfer is an isochronous type transfer that includes a video data stream and a multichannel audio stream (see col 11 lines 47-58 reference, paying particular attention to use of same time base) and wherein the information transfer is an asynchronous transfer (col 14 lines 34-39, asynchronous arrangement of active video periods and data islands).

For claim 13 and 33, Wolf discloses wherein the receiver unit includes a time-base recovery unit (see column 13 lines 12-16) arranged to regenerate (see column 39 lines 65-67) a particular data stream's native rate based upon a time stamp embedded within the main link data packets (see column 8 lines 44-51 and column 13 lines 12-16).

For claim 18 and 38, Wolf discloses wherein the number of

multimedia data streams are multiplexed to form a single data stream suitable for transmission over the linking unit (see column 29 lines 39-41).

For claim 19 and 39, Wolf discloses wherein some of the multimedia data packets include a number of sub-packets (see Figure 9 and see column 34 lines 53-58).

For claim 41, Wolf discloses a packet (see column 8 lines 50-55 "packet …sub-packet") based video interface (see Figure 2, 2') for coupling (see Figure 2, CH0-3) a source device (Figure 2, 13) and a display device (see Figure 2, 26), comprising:

a source application layer (see Figure 2, 13 "MPEG2" and 1') arranged to provide a source (see Figure 2, 13) data stream (see Figure 2 "DigVideo" and Figure 8 "Packet 1", "Packet 2…"), a data stream format (see Figure 8 , "Control Data", Data Island", Control Data", Video Data" and column 10 lines 35-40 "format in which video data"), a number of data stream attributes (see column 6 lines 9-11 "stream…same clock frequency"), and a stream identification number (see Figure 8 "Preamble" and column 7 lines 50-60 "identify…data island…active video period");

a source link layer (see column 29 lines 37-42 "two or more streams….time-multiplexer") coupled to the source application layer (see Figure 2, 13 "MPEG2" and 1') arranged to provide link initialization (see column 43 lines 4-15 "initiate and HDCP authentication….setting up transmitter") and video interface management functions (see column 43 lines 5-23 "transmitter to enter the Data Island Mode….trigger the receiver's entry into the Data Island Mode…query …registers…verify");

a source physical layer (see column 3 lines 16-25 “DVI” and Figure 13 “TMDS Link” and Figure 2 “DDC” "TMDS Tx" “Video”, 1’) coupled to the source link layer (see column 29 lines 37-42 “two or more streams….time-multiplexer”) that includes,

a source logical layer (see Figure 2, 13 and column 55 lines 42-55 “unit 151….packetized data island” and column 47 lines 27-30 “Transmitter…packetizing”) arranged to at least packetize data (see Figure 2, 13 and column 55 lines 42-55 “unit 151….packetized data island” and column 47 lines 27-30 “Transmitter…packetizing”). scramble data (see column 53 lines 1-4 “TMDS-encoded”), generate link training patterns (see column 50 lines 14-20 “test pattern generator”). Encode (see column 53 lines 1-4 “TMDS-encoded”) and decode data (see column 50 lines 28-32 “decodes that data”), and

a source electrical layer (see column 30 lines 60-65 “DVI specification” and see column 3 lines 16-25 “DVI” and Figure 13 “TMDS Link”) that includes circuitry for initialization (see column 43 lines 4-15 “initiate and HDCP authentication….setting up transmitter”), parallel to serial (see column 29 lines 37-42 “two or more streams….time-multiplexer” and column 36 lines 60 “multiplexer”)

and serial to parallel conversions (see column 49 lines 60-65 “demultiplexing” and Figure 2 “AnVideo”, DigVideo”, “SPDIF”, “MCLK”), and spread spectrum capable PLLs (see Figure 13 “Filter PLL” ,”Main PLL”);

a bidirectional auxiliary channel (see Figure 2, “DDC” or “CH0-3”) coupling the source physical layer (see column 3 lines 16-25 “DVI” and Figure 13 “TMDS Link” and Figure 2 “DDC”) and a display device physical layer (see Figure 2, 2’ 26) arranged to transmit

information (see Figure 2, "AnVideo", "DigVideo") between the source physical layer (see column 3 lines 16-25 "DVI" and Figure 13 "TMDS Link" and Figure 2 "DDC") and the display device physical layer (see Figure 2, "Display Circuitry") and vice versa; and a unidirectional main link (see fig 2; CH0-3; column 4 lines 57-66 "unidirectionally….TMDS link") coupling the coupling the source physical layer (see column 3 lines 16-25 "DVI" and Figure 13 "TMDS Link" and Figure 2 "DDC" "TMDS Tx" "Video", 1') and the display device physical layer (see Figure 2, 2' 26) arranged to transmit information (see Figure 2 "TMDS Tx") between the source physical layer (see column 3 lines 16-25 "DVI" and Figure 13 "TMDS Link" and Figure 2 "DDC" "TMDS Tx" "Video", 1') and the display device physical layer (see Figure 2, 2' 26), and the bidirectional auxillary channel (see Figure 2, "DDC" or "CH0-3") and the unidirectional main line (see fig 2; CH0-3; column 4 lines 57-66 "unidirectionally….TMDS link").

For claim 42, Wolf discloses a display device application layer (See Figure 2, 23, 25) arranged to provide (see Figure 2 ,23, "DDC", 15 and column 46 lines 6-15 "determine the capabilities and characteristics of the receiver") a set of display attributes ((see Figure 2 ,23, "DDC", 15 and column 46 lines 6-15 "determine the capabilities and characteristics of the receiver") to the source application layer (see Figure 2, 13 "MPEG2" and 1' "HOST I2C"); and a display device link layer (see Figure 2 "DDC" and 2', "HOST I2C") coupling (see Figure 2 "DDC" and 2', "HOST I2C") the display device application layer (See Figure 2, 23, 25) to the display device physical layer (see Figure 2, CH0-CHC "TMDS RX").

For claim 43, Wolf discloses wherein the display device application layer (See Figure 2, 23, 25) and the source application layer (see Figure 2, 13 "MPEG2" and 1' "HOST I2C") are each an application programming interface (see Figure 2, 13 "MPEG2" and 1' "HOST I2C" and Figure 2, 23, 25 and column 13 lines 22-25 "program generated" , column 43 lines 3-20 "programmed", column 58 lines 5-15 "programmed") that describes a format (see column 10 lines 35-40 "format …video data") for the source data stream (see Figure 8 , "Control Data", Data Island", Control Data", Video Data" and column 10 lines 35-40 "format in which video data") and the display device (see Figure 2, 2' "Video", 26).

Wolf is silent about:

For claim 1, and 21 wherein the linking unit does not include a clock line.

For claim 41, wherein channels do not include a clock line.

Shay from the same or similar field of endeavor disclose an communication system with the following features:

For claim 1 and 21, Shay discloses wherein the linking unit (see Figure 2, "INPUTS" and see section 0060 lines 1-15 "audio channels" and see section 0024 lines 1-5 "links") does not include a clock line (see section 0075 lines 1-11 "recover digital audio synchronization….statistical filtering of received timestamped clock information packets" and section 0096-0097 "clock synchronization recovery….synchronization scheme….timestamped clock references").

For claim 41, wherein channels (see Figure 2, "INPUTS" and see section 0060 lines 1-15 "audio channels" and see section 0024 lines 1-5 "links") do not include a clock line (see

section 0075 lines 1-11 "recover digital audio synchronization….statistical filtering of received timestamped clock information packets" and section 0096-0097 "clock synchronization recovery….synchronization scheme….timestamped clock references"). It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Wolf by using the features, as taught by Shay, so that less physical means (wire etc) needs to be used which reduces the cost of network/interface infrastructure (see column 2 lines 65-67), since no separate line is needed to provide the clock and in order to account for any propagation delay between the source and destination. Furthermore, one of the ordinary skill in the art could have applied the technique of using timestamps as a synchronization means in the same ways it was presented in Shay into the system of Wolf and the results would have been predictable to one of the ordinary skill in the art.

5. Claim 5-7, 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (US 6,914,637 B1) and Shay et al. (US 2004/0114607) as applied to claim 2/22 above, in view of Fuhrman (5,745,837):

For claim 5 and 25, Wolf and Shay recite all the claimed limitation as described in claim 2. Wolf does not teach that the main link is consisting of virtual links. Fuhrmann from the same or similar field of endeavor teaches a number of virtual links (see column 38 lines 6-8, each CPE is connected via virtual link) each being associated with a particular one of the multimedia data packet streams (see column 36, lines 13-18 , lines 25-28 ATM transports multimedia content in) wherein each of said virtual links has an associated virtual link bandwidth (see column 3 lines 46-55, the bandwidth for the virtual links, of each CPE, is

allocated) and a virtual link rate (see column 56 lines 27-29 the rate of each virtual link is counted, see also column 49 line 60 to column 50 line 7, each CPE can have a varieties of rates and each CPE is connected via a virtual link). Thus it would have been obvious to a person of ordinary skill at the time the invention was made to incorporate the virtual link structure into the communication system as taught by Wolf et al. The virtual link architecture is an abstract idea thus it could have been implemented in the microcontroller of the source device (see Wolf et al. Figure 2, reference 15) via software. Thus one is able to implement the virtual link architecture into the system of Wolf et al. The motivation is that one is able to divide the single physical channel, in an organized manner to different source devices. Thus one can control how much bandwidth each source device gets.

For claim 6 and 26, Wolf, Shay and Fuhrmann teach the claimed invention as in claim 5. Wolf does not teach where the virtual link bandwidths are less of equal to the main link bandwidth. Fuhrmann from the same or similar field of endeavor wherein a main link bandwidth is at least equal to an aggregate of the virtual link bandwidths (see Figure 45A and 45B, reference sign 1150, we can have a case where the total number of CPE connections through virtual links is equal of less to the total available channels). Thus it would have been obvious to a person of ordinary skill at the time the invention was made to incorporate a network control that makes sure that the virtual links bandwidth does not exceed the main link bandwidth. One would have been able to implement the method shown in Figure 45A and 45B of Fuhrmann via software in the microcontroller (shown in Figure 2) of Wolf . The motivation is that one needs such a control mechanism in order to allocate bandwidth to stream when there is no available bandwidth left.

For claim 7 and 27, Wolf and Shay teach the claimed invention as in claim 1. Wolf does not teach packetizing streams into virtual links. Fuhrmann from the same or similar field of endeavor teaches wherein the source data stream (see column 36 lines 25-31) is packetized over the respective virtual link based upon a mapping definition (see column 36 lines 25-39, see also Figure 27, "SAR" and note "virtual link information"). Thus it would have been obvious to a person of ordinary skill at the time the invention was made to incorporate this distribution method into the communication system as taught by Wolf et al. One could have added the SAR circuit as taught by Fuhrman into the transmitter (Figure 2, reference 1' of Wolf). For example one could have added the SAR circuit between the "Audio" /"Video" and the "TMDS TX" circuit as shown in Figure 2 of Wolf et al. The motivation is that if we are able to divide the different stream into the virtual links, it is possible to resolve contentions on shared access channels such as the channels taught by Wolf et al. Once again we are able to control the transmission of different source streams a shared channel.

6. Claim 12, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (US 6,914,637 B1) in view of Shay et al. (US 2004/0114607).

For claim 12 and 32, Wolf et al. and Shay discloses all aspects of the invention of claim 1, but fails to explicitly disclose that the main link rate is adjustable in the range that includes 1.0 Gigabits per second to 2.5 Gbps. Official notice is taken that it would have been obvious to one ordinarily skilled in the art at the time of the invention to include this functionality to arrive at the invention of claim 12. One would have been able to incorporate those speeds into the system of Wolf by implementing a different clock in the transmitter device. The motivation to do so would have been to accommodate different

cable lengths and materials so as to avoid signal dispersion and attenuation of longer cables or poorer (less expensive) conductors.

For claim 14 and 34, Wolf discloses a display interface as recited in claim 13, wherein the time stamp is based upon a determination of a number of native stream clocks in 2^20 cycles of link cycle clock frequency period (see column 64 lines 29-32, the counter counts the clock cycles and generates the time stamp according to it, additionally see figure 23 for multiple streams of Cycle Time Stamps (CTS); the number of cycles could be 2^20). Official notice is taken that, it would have been obvious to a person of ordinary skill at the time the invention was made to use 2^20 cycles in determining the time stamp. One could have easily implemented a counting mechanism, either via software or digital circuitry, to use 2^20 cycles in determining the time stamp. The motivation is that is we take along amount of clock cycles to determine the Cycle Time Stamp, the system can synchronize the pixel clock and the master clock, thus converging the Time stamp to a almost constant value.

7. Claim 20 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolf et al. (US 6,914,637 B1) and Shay et al. (US 2004/0114607) as applied to claim 19/39 above, in view of Roberts (4,796,203):

For claim 20 and 40, Wolf teaches all of the claimed invention as described in claim 19, additionally Wolf teaches to transmit a displaying image by way of sub-packets (see column 12 lines 59-62, sink device displays information received) included in a corresponding video data stream (see Figure 9 and see column 34 lines 53-58). Wolf does not teach a refresh unit that selectively updates portions of images that need to be update. Roberts from the same or similar field of endeavor teaches a selective refresh unit (see Figure 1, “Interface 10”)

included in the sink device (see figure 1, reference sign 12, "Monitor") that updates only a portion of a displayed graphics image for every video frame (see column 5 lines 50-60, only new image information are used) based upon a number of image coordinates corresponding to the updated portion of the displayed image (see column 5 lines 61-64, only new image information is updated). Thus it would have been obvious for a person of ordinary skill in the art the invention was made to combine the selective refresh interface as taught by Roberts into the video transmission system as taught by Wolf. One could have easily implemented the circuit that Roberts presents in Figure 1 into the transmitter device as taught by Wolf. One could have added this circuit and especially the refresh memory as the first circuitry into the transmitter, so that it receives the video signal from the source device (MPEG 2 encoder). The motivation is if this circuitry is build in, image portions that do not change need not be updated and thus this redundant information does not need to be transmitted over the link. This obviously saves link bandwidth.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenan Cehic whose telephone number is (571) 270-3120. The examiner can normally be reached on Monday through Friday 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571) 272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Kenan Cehic/

Examiner, Art Unit 2616

/Kwang B. Yao/

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